

In the claims:

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57. (Currently Amended) A method of stimulating a population of undifferentiated mammalian mesodermally derived cells to undergo hematopoiesis, comprising contacting the cells with an amount of a hedgehog compound effective to stimulate the cells to undergo hematopoiesis, wherein the hedgehog compound comprises a polypeptide sequence at least 80% identical to a sequence selected from SEQ ID NO: 34, SEQ ID NO: 35, SEQ ID NO: 36, SEQ ID NO: 37, SEQ ID NO: 38, SEQ ID NO: 39, SEQ ID NO: 40, or a fragment <sup>of said polypeptide sequence</sup> thereof, which polypeptide sequence <sup>or fragment of said polypeptide sequence</sup> is functionally equivalent to a ~~naturally occurring hedgehog protein~~, binds to *patched* and induces cells to undergo hematopoiesis.

58. (Previously Added) A method according to claim 57, wherein the hedgehog compound is an Indian hedgehog, Desert hedgehog, or Sonic hedgehog protein or a fragment thereof which binds to *patched* and induces cells to undergo hematopoiesis.

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59. (Currently Amended) A method according to claim 57, wherein the hedgehog compound is an Indian hedgehog protein or a fragment thereof which binds to *patched* and induces cells to undergo hematopoiesis.

60. (Previously Amended) A method according to claim 82, wherein the TGF- $\beta$  polypeptide is a bone morphogenic protein.

61. (Previously Amended) A method according to claim 60, wherein the bone morphogenic protein is BMP-2, BMP-4, BMP-6, or BMP-7.

62. (Previously Amended) A method according to claim 57, further comprising maintaining the cell population in vitro in a culture medium, and wherein contacting the cells with a hedgehog compound includes contacting the cells with a culture medium comprising the hedgehog compound.

63. **(Previously Amended)** A method according to claim 57, wherein the undifferentiated mesodermally derived cells are hematopoietic stem cells.
64. **(Previously Amended)** A method according to claim 63, wherein the hematopoietic stem cells are selected from cord blood cells, fetal liver cells, and peripheral blood cells.
65. **(Previously Amended)** A method according to claim 63, wherein the hematopoietic stem cells are obtained from adult bone marrow cells.
66. **(Previously Amended)** A method according to claim 57, wherein the cells are progenitor cells obtained from an adult human.
67. **(Previously Amended)** A method according to claim 57, wherein the cells comprise embryonic tissue.
68. **(Previously Amended)** A method according to claim 57, wherein the cells comprise an embryonic explant culture.
69. **(Previously Amended)** A method according to claim 68, wherein the embryonic explant culture is a blastocyst.
70. **(Previously Amended)** A method according to claim 57, wherein the cells are hematopoietic stem cells within the bone marrow of an animal.
71. **(Previously Amended)** A method according to claim 57, wherein the cells are hematopoietic stem cells present in the animal in at least one of bone marrow, cord blood cells, fetal liver cells and peripheral blood cells.
72. **(Previously Amended)** A method according to claim 70, wherein contacting the stem cells with the hedgehog compound includes administering an effective dose of the

compound to the animal by any of oral, intradermal, subcutaneous, transmucosal, intramuscular, or intravenous routes.

73. **(Previously Amended)** A method according to claim 82, wherein the TGF- $\beta$  polypeptide enhances the stimulation of hematopoiesis of the cells by more than the amount of stimulation of hematopoiesis resulting from administration of an identical amount of the TGF- $\beta$  polypeptide in the absence of the hedgehog compound.

82. **(Previously Added)** A method according to claim 57, further comprising contacting the cells with a TGF- $\beta$  polypeptide.

19 83. **(Currently Amended)** A method of stimulating hematopoiesis in an animal, comprising administering to the animal an effective amount of a hedgehog compound comprising a polypeptide sequence at least 80% identical to a sequence selected from SEQ ID NO: 34, SEQ ID NO: 35, SEQ ID NO: 36, SEQ ID NO: 37, SEQ ID NO: 38, <sup>of said polypeptide sequence</sup> SEQ ID NO: 39, SEQ ID NO: 40, or a fragment <sup>or fragment thereof</sup> thereof, which polypeptide sequence <sup>is</sup> ~~functionally equivalent to a naturally occurring hedgehog protein;~~ binds to *patched* and induces cells to undergo hematopoiesis.

84. **(Previously Added)** A method according to claim 83, wherein the hedgehog compound is an Indian hedgehog, Desert hedgehog, or Sonic hedgehog protein or a fragment thereof which binds to *patched* and induces cells to undergo hematopoiesis.

85. **(Previously Amended)** A method according to claim 83, further comprising contacting the cells with a TGF- $\beta$  polypeptide.

86. **(Previously Added)** A method according to claim 85, wherein the TGF- $\beta$  polypeptide is a bone morphogenic protein.

87. **(Previously Added)** A method according to claim 86, wherein the bone morphogenic protein is selected from BMP-2, BMP-4, BMP-6, and BMP-7.

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88. (Currently Amended) A method of stimulating a population of undifferentiated mammalian mesodermally derived cells to undergo hematopoiesis, comprising contacting the cells with an effective amount of a hedgehog compound comprising a polypeptide sequence of SEQ ID NO: 41, SEQ ID NO: 42, or a fragment <sup>of said polypeptide sequence</sup> thereof, which polypeptide sequence <sup>or fragment thereof</sup> is functionally equivalent to a naturally occurring hedgehog protein, binds to *patched* and induces cells to undergo hematopoiesis.

89. (Previously Amended) A method according to claim 88, wherein the undifferentiated mesodermally-derived cells are a population of hematopoietic stem cells.

90. (Previously Added) A method according to claim 89, wherein the hematopoietic stem cells are selected from cord blood cells, fetal liver cells, and peripheral blood cells.

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91. (Currently Amended) A method according to claim <sup>26</sup> 89, wherein the cells are ~~human~~ progenitor cells of human origin.

92. (Previously Added) A method according to claim 89, wherein the cells are hematopoietic stem cells within the bone marrow of the animal.

93. (Previously Added) A method according to claim 89, wherein the cells are hematopoietic stem cells present in the animal in at least one of bone marrow, cord blood cells, fetal liver cells and peripheral blood cells.

94. (Previously Added) A method according to claim 83, wherein an effective dose of the hedgehog compound is administered to the animal by any of oral, intradermal, subcutaneous, transmucosal, intramuscular, or intravenous routes.

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95. (Currently Amended) A method of stimulating hematopoiesis in an animal, comprising administering to the animal an effective amount of a hedgehog compound comprising a polypeptide sequence of SEQ ID NO: 41, SEQ ID NO: 42, or a fragment <sup>of said polypeptide sequence</sup> thereof, which polypeptide sequence <sup>or fragment thereof</sup> is functionally equivalent to a naturally occurring hedgehog protein, binds to *patched* and induces cells to undergo hematopoiesis.

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(Currently Amended) A method of stimulating a population of undifferentiated mammalian mesodermally derived cells to undergo hematopoiesis, comprising contacting the cells with an amount of a hedgehog compound effective to stimulate the cells to undergo hematopoiesis, wherein the hedgehog compound comprises a polypeptide sequence encoded by a nucleic acid which hybridizes under stringent conditions, including a wash step of 0.2 x SSC at 65 °C, to a nucleic acid sequence designated in one of SEQ ID Nos. 27-33, which polypeptide sequence ~~is functionally equivalent to a naturally occurring hedgehog protein,~~ binds to *patched* and induces cells to undergo hematopoiesis.

97. (Previously Added) A method according to claim 96, wherein the hedgehog compound is an Indian hedgehog, Desert hedgehog, or Sonic hedgehog protein or a fragment thereof which binds to *patched* and induces cells to undergo hematopoiesis.

98. (Previously Amended) A method according to claim 96, wherein the hedgehog compound is an Indian hedgehog protein or a fragment thereof which binds to *patched*.

99. (Previously Added) A method according to claim 96, further comprising contacting the cells with a TGF- $\beta$  polypeptide.

100. (Previously Added) A method according to claim 99, wherein the TGF- $\beta$  polypeptide is a bone morphogenic protein.

101. (Previously Added) A method according to claim 100, wherein the bone morphogenic protein is BMP-2, BMP-4, BMP-6, or BMP-7.

102. (Previously Added) A method according to claim 96, further comprising maintaining the cell population in vitro in a culture medium, and wherein contacting the cells with a hedgehog compound includes contacting the cells with a culture medium comprising the hedgehog compound.

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103. **(Previously Added)** A method according to claim 96, wherein the undifferentiated mesodermally derived cells are hematopoietic stem cells.

104. **(Previously Added)** A method according to claim 103, wherein the hematopoietic stem cells are selected from cord blood cells, fetal liver cells, and peripheral blood cells.

105. **(Previously Added)** A method according to claim 103, wherein the hematopoietic stem cells are obtained from adult bone marrow cells.

106. **(Previously Added)** A method according to claim 96, wherein the cells are progenitor cells obtained from an adult human.

107. **(Previously Added)** A method according to claim 96, wherein the cells comprise embryonic tissue.

108. **(Previously Added)** A method according to claim 96, wherein the cells comprise an embryonic explant culture.

109. **(Previously Added)** A method according to claim 108, wherein the embryonic explant culture is a blastocyst.

110. **(Previously Added)** A method according to claim 96, wherein the cells are hematopoietic stem cells within the bone marrow of an animal.

111. **(Previously Added)** A method according to claim 96, wherein the cells are hematopoietic stem cells present in the animal in at least one of bone marrow, cord blood cells, fetal liver cells and peripheral blood cells.

112. **(Previously Added)** A method according to claim 111, wherein contacting the stem cells with the hedgehog compound includes administering an effective dose of the

compound to the animal by any of oral, intradermal, subcutaneous, transmucosal, intramuscular, or intravenous routes.

113. **(Previously Amended)** A method according to claim 99, wherein the TGF- $\beta$  polypeptide enhances the stimulation of hematopoiesis of the cells by more than the amount of stimulation of hematopoiesis resulting from administration of an identical amount of the TGF- $\beta$  polypeptide in the absence of the hedgehog compound.

114. **(Previously Added)** A method of stimulating a population of undifferentiated mammalian mesodermally derived cells to undergo hematopoiesis, comprising contacting the cells with means for activating hedgehog signaling in an amount effective to stimulate the cells to undergo hematopoiesis.

115. **(Previously Added)** A method according to claim 114, wherein the means for activating hedgehog signaling comprises Indian hedgehog, Desert hedgehog, or Sonic hedgehog protein or a fragment thereof which binds to *patched* and induces cells to undergo hematopoiesis.

116. **(Previously Added)** A method according to claim 114, wherein the means for activating hedgehog signaling comprises Indian hedgehog protein or a fragment thereof which binds to *patched*.

117. **(Previously Added)** A method according to claim 131, wherein the TGF- $\beta$  polypeptide is a bone morphogenic protein.

118. **(Previously Added)** A method according to claim 117, wherein the bone morphogenic protein is BMP-2, BMP-4, BMP-6, or BMP-7.

119. **(Previously Added)** A method according to claim 114, further comprising maintaining the cell population in vitro in a culture medium, and wherein contacting the cells with a means for activating hedgehog signaling includes contacting the cells with a culture medium comprising the means for activating hedgehog signaling.

120. **(Previously Added)** A method according to claim 114, wherein the undifferentiated mesodermally derived cells are hematopoietic stem cells.
121. **(Previously Added)** A method according to claim 120, wherein the hematopoietic stem cells are selected from cord blood cells, fetal liver cells, and peripheral blood cells.
122. **(Previously Added)** A method according to claim 120, wherein the hematopoietic stem cells are obtained from adult bone marrow cells.
123. **(Previously Added)** A method according to claim 114, wherein the cells are progenitor cells obtained from an adult human.
124. **(Previously Added)** A method according to claim 114, wherein the cells comprise embryonic tissue.
125. **(Previously Added)** A method according to claim 114, wherein the cells comprise an embryonic explant culture.
126. **(Previously Added)** A method according to claim 125, wherein the embryonic explant culture is a blastocyst.
127. **(Previously Added)** A method according to claim 114, wherein the cells are hematopoietic stem cells within the bone marrow of an animal.
128. **(Previously Added)** A method according to claim 114, wherein the cells are hematopoietic stem cells present in the animal in at least one of bone marrow, cord blood cells, fetal liver cells and peripheral blood cells.
129. **(Previously Added)** A method according to claim 127, wherein contacting the stem cells includes administering an effective amount to the animal by any of oral, intradermal, subcutaneous, transmucosal, intramuscular, or intravenous routes.



130. **(Previously Added)** A method according to claim 131, wherein the TGF- $\beta$  polypeptide enhances the stimulation of hematopoiesis of the cells by more than the amount of stimulation of hematopoiesis resulting from administration of an identical amount of the TGF- $\beta$  polypeptide in the absence of the means for activating hedgehog signaling.

131. **(Previously Added)** A method according to claim 114, further comprising contacting the cells with a TGF- $\beta$  polypeptide.

132. **(Previously Added)** A method of stimulating hematopoiesis in an animal, comprising administering to the animal means for activating hedgehog signaling in an amount effective to induce cells to undergo hematopoiesis.

133. **(Previously Added)** A method according to claim 132, wherein the means for activating hedgehog signaling comprises Indian hedgehog, Desert hedgehog, or Sonic hedgehog protein or a fragment thereof which binds to *patched* and induces cells to undergo hematopoiesis.

134. **(Previously Added)** A method according to claim 132, further comprising contacting the cells with a TGF- $\beta$  polypeptide.

135. **(Previously Added)** A method according to claim 134, wherein the TGF- $\beta$  polypeptide is a bone morphogenic protein.

136. **(Previously Added)** A method according to claim 135, wherein the bone morphogenic protein is selected from BMP-2, BMP-4, BMP-6, and BMP-7.

137. **(Previously Added)** A method of stimulating a population of undifferentiated mammalian mesodermally derived cells to undergo hematopoiesis, comprising contacting the cells with means for binding *patched* and thereby activating hedgehog signaling in an amount effective to induce cells to undergo hematopoiesis.

138. **(Previously Added)** A method according to claim 137, wherein the undifferentiated mesodermally derived cells are a population of hematopoietic stem cells.

139. **(Previously Added)** A method according to claim 138, wherein the hematopoietic stem cells are selected from cord blood cells, fetal liver cells, and peripheral blood cells.

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140. **(Currently Amended)** A method according to claim 138, wherein the cells are human progenitor cells of human origin.

141. **(Previously Added)** A method according to claim 138, wherein the cells are hematopoietic stem cells within the bone marrow of the animal.

142. **(Previously Added)** A method according to claim 138, wherein the cells are hematopoietic stem cells present in the animal in at least one of bone marrow, cord blood cells, fetal liver cells and peripheral blood cells.

143. **(Previously Added)** A method according to claim 132, wherein an effective dose is administered to the animal by any of oral, intradermal, subcutaneous, transmucosal, intramuscular, or intravenous routes.

144. **(Previously Added)** A method of stimulating hematopoiesis in an animal, comprising administering to the animal means for binding *patched* and thereby activating hedgehog signaling in an amount effective to induce cells to undergo hematopoiesis.